

功能：生成曼宁G2三次几何样条闭曲线

输入参数：m\_aVertex-数据点，为受保护成员。

输出参数：BezierPoint-样条曲线分段贝齐尔表示的B样条控制顶点，为受保护成员。

```
void CreatManningSpline()
{
    double lenth,dotx,doty;
    int n=GetVertexCount();
    int n0=n-2;
    Alpha.SetSize(n);
    CArray<CArray<double, double>, CArray<double, double>> NewAlpha;
    NewAlpha.SetSize(n);
    left.SetSize(n); right.SetSize(n);
    BezierPoint.SetSize(3*n0+1);
    for(int i=0;i<=n0+1;i++)
    {
        Alpha[i].SetSize(2);
        NewAlpha[i].SetSize(2);
    }
    if(n0==2)
    {
        lenth=sqrt((m_aVertex[1].x-m_aVertex[0].x)*(m_aVertex[1].x-m_aVertex[0].x)+(m_aVertex[1].y-m_aVertex[0].y)
        *(m_aVertex[1].y-m_aVertex[0].y));
        Alpha[0][0]=-(m_aVertex[1].y-m_aVertex[0].y)/lenth;
        Alpha[0][1]=(m_aVertex[1].x-m_aVertex[0].x)/lenth;
        Alpha[1][0]=(m_aVertex[1].y-m_aVertex[0].y)/lenth;
        Alpha[1][1]=-(m_aVertex[1].x-m_aVertex[0].x)/lenth;
        Alpha[2][0]=Alpha[0][0];
        Alpha[2][1]=Alpha[0][1];
        right[0]=2.*lenth;
        left[0]=right[0];
        right[1]=right[0];
        left[1]=right[0];
        right[2]=right[0];
        left[2]=right[0];
    }
    if(n0>2)
    {
        for(i=1;i<=n0;i++)
        {
            lenth=sqrt((m_aVertex[i+1].x-m_aVertex[i-1].x)*(m_aVertex[i+1].x-m_aVertex[i-1].x)+(m_aVertex[i+1].y-m_aVertex[i-1].y)
            *(m_aVertex[i+1].y-m_aVertex[i-1].y));
            Alpha[i][0]=(m_aVertex[i+1].x-m_aVertex[i-1].x)/lenth;
            Alpha[i][1]=(m_aVertex[i+1].y-m_aVertex[i-1].y)/lenth;
        }
        Alpha[0][0]=Alpha[n0][0];
        Alpha[0][1]=Alpha[n0][1];
        Alpha[n0+1][0]=Alpha[1][0];
        Alpha[n0+1][1]=Alpha[1][1];
        for(i=1;i<=n0;i++)
        {
            lenth=sqrt((m_aVertex[i+1].x-m_aVertex[i].x)*(m_aVertex[i+1].x-m_aVertex[i].x)+(m_aVertex[i+1].y-m_aVertex[i].y)
            *(m_aVertex[i+1].y-m_aVertex[i].y));
            dotx=(2.*Alpha[i][0]+Alpha[i+1][0])/3.*(m_aVertex[i+1].x-m_aVertex[i].x)/lenth;
            doty=(2.*Alpha[i][1]+Alpha[i+1][1])/3.*(m_aVertex[i+1].y-m_aVertex[i].y)/lenth;
            left[i+1]=2.*lenth/(1.+dotx+doty);
            dotx=(2.*Alpha[i+1][0]+Alpha[i][0])/3.*(m_aVertex[i+1].x-m_aVertex[i].x)/lenth;
            doty=(2.*Alpha[i+1][1]+Alpha[i][1])/3.*(m_aVertex[i+1].y-m_aVertex[i].y)/lenth;
            right[i]=2.*lenth/(1.+dotx+doty);
        }
        left[0]=left[n0];
        left[1]=left[n0+1];
        right[0]=right[n0];
        right[n0+1]=right[1];
        for(i=1;i<=n0;i++)
        {
            NewAlpha[i][0]=3.*(right[i]*right[i]*(m_aVertex[i].x-m_aVertex[i-1].x)+left[i]*left[i]*(m_aVertex[i+1].x-
            m_aVertex[i].x))-right[i-1]*right[i]*right[i]*Alpha[i-1][0]-left[i]*left[i]*left[i+1]*Alpha[i+1][0];
            NewAlpha[i][1]=3.*(right[i]*right[i]*(m_aVertex[i].y-m_aVertex[i-1].y)+left[i]*left[i]*(m_aVertex[i+1].y-
            m_aVertex[i].y))-right[i-1]*right[i]*right[i]*Alpha[i-1][1]-left[i]*left[i]*left[i+1]*Alpha[i+1][1];
            lenth=sqrt(NewAlpha[i][0]*NewAlpha[i][0]+
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                                CreatManningSpline.txt
                                NewAlpha[i][1]*NewAlpha[i][1]);
                                NewAlpha[i][0]=NewAlpha[i][0]/lenth;
                                NewAlpha[i][1]=NewAlpha[i][1]/lenth;
                                }
                                NewAlpha[0][0]=NewAlpha[n0][0];
                                NewAlpha[0][1]=NewAlpha[n0][1];
                                NewAlpha[n0+1][0]=NewAlpha[1][0];
                                NewAlpha[n0+1][1]=NewAlpha[1][1];
                                for(i=0;i<=n0-1;i++)
                                {
while (fabs(NewAlpha[i][0]-Alpha[i][0])>=0.00001 || fabs(NewAlpha[i][1]-Alpha[i][1])>=0.00001)
    {
        for(int j=i;j<=n0;j++)
        {
            Alpha[j][0]=NewAlpha[j][0];
            Alpha[j][1]=NewAlpha[j][1];
        }
        Alpha[0][0]=NewAlpha[n0][0];
        Alpha[0][1]=NewAlpha[n0][1];
        Alpha[n0+1][0]=NewAlpha[1][0];
        Alpha[n0+1][1]=NewAlpha[1][1];
        for(int k=1;k<=n0;k++)
        {
lenth=sqrt((m_aVertex[k+1].x-m_aVertex[k].x)*(m_aVertex[k+1].x-m_aVertex[k].x)+(m_aVertex[k+1].y-m_aVertex[k].y)*(m_aVertex[k+1].y-m_aVertex[k].y))
dotx=(2.*Alpha[k][0]+Alpha[k+1][0])/3.*(m_aVertex[k+1].x-m_aVertex[k].x)/lenth;
doty=(2.*Alpha[k][1]+Alpha[k+1][1])/3.*(m_aVertex[k+1].y-m_aVertex[k].y)/lenth;
left[k+1]=2.*lenth/(1.+dotx+doty);

dotx=(2.*Alpha[k+1][0]+Alpha[k][0])*(m_aVertex[k+1].x-m_aVertex[k].x)/lenth;
doty=(2.*Alpha[k+1][1]+Alpha[k][1])*(m_aVertex[k+1].y-m_aVertex[k].y)/lenth;
right[k]=2.*lenth/(1.+dotx+doty);
        }
        left[0]=left[n0];
        left[n0+1]=left[1];
        right[n0+1]=right[1];
        for(int l=1;l<=n0;l++)
        {
NewAlpha[l][0]=3.*(right[l]*right[l]*(m_aVertex[l].x-m_aVertex[l-1].x)+left[l]*left[l]*(m_aVertex[l+1].x-m_aVertex[l].x))-right[l-1]*right[l]*right[l]*Alpha[l-1][0]-left[l]*left[l]*left[l+1]*Alpha[l+1][0];
NewAlpha[l][1]=3.*(right[l]*right[l]*(m_aVertex[l].y-m_aVertex[l-1].y)+left[l]*left[l]*(m_aVertex[l+1].y-m_aVertex[l].y))-right[l-1]*right[l]*right[l]*Alpha[l-1][1]-left[l]*left[l]*left[l+1]*Alpha[l+1][1];
lenth=sqrt(NewAlpha[l][0]*NewAlpha[l][0]+NewAlpha[l][1]*NewAlpha[l][1]);
NewAlpha[l][0]=NewAlpha[l][0]/lenth;
NewAlpha[l][1]=NewAlpha[l][1]/lenth;
        }
    }
}
for(i=0;i<n0;i++)
{
    BezierPoint[3*i].x=m_aVertex[i].x;
    BezierPoint[3*i].y=m_aVertex[i].y;
    BezierPoint[3*i+1].x=int(m_aVertex[i].x+right[i]*Alpha[i][0]/3.);
    BezierPoint[3*i+1].y=int(m_aVertex[i].y+right[i]*Alpha[i][1]/3.);
    BezierPoint[3*i+2].x=int(m_aVertex[i+1].x-left[i+1]*Alpha[i+1][0]/3.);
    BezierPoint[3*i+2].y=int(m_aVertex[i+1].y-left[i+1]*Alpha[i+1][1]/3.);
}
BezierPoint[3*n0].x=m_aVertex[n0].x;
BezierPoint[3*n0].y=m_aVertex[n0].y;
}

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